

P&M Telephone Hearing Study

July 1997

Research and Development Branch
Licensing Operations Division
California Department of Motor Vehicles

Author: Len A. Marowitz

RSS-97-170

ACKNOWLEDGMENTS

The author would like to acknowledge the managerial and supervisory guidance of Raymond C. Peck and Clifford J. Helander, and the document design and preparation assistance of Debbie M. McKenzie and Douglas Luong. Richard Hensley provided invaluable information on the meaning of Driver Safety terminology and the functioning of Driver Safety hearings.

EXECUTIVE SUMMARY

Driver Safety memo DS-92-96, dated June 29, 1992, has resulted in departmental reexaminations, hearings, and interviews, all formerly held in-person, to be held through a combination of in-person and telephone contacts. Telephone contacts are considered by some to be more cost effective than in-person contacts, but have been criticized as affording individuals the opportunity to hide serious impairments from visual observation. In-person contacts are still required in cases of mild dementia, and when individuals request them, so many such contacts still occur.

This study examines the effect of the policy change by comparing the process outcomes (actions taken) of driver safety contacts which occurred prior to the policy change, when all contacts were in-person (last half of 1992), with the process outcomes after the policy change, when there was a mixture of in-person and telephone contacts (last half of 1994). The rate of accidents in the year after each contact period is compared to determine the effectiveness of P&M actions in decreasing accident risk in the pre- and post-policy change periods. The study also compares, during the post-policy change period, the effect of in-person versus telephone contacts on process outcomes and accident rates.

The study found that the policy change affected reexamination outcomes, with probation being used significantly less for mental, physical, and lapses cases, and revocation being used more for mental cases. Hearing outcomes were unaffected. Interviews had fewer actions sustained and more actions terminated for alcohol cases, but more sustains and fewer terminations for lapses cases after the policy change. The accident rate after P&M reexaminations did not change as a result of the policy change for any of the P&M groups.

Contact type (in-person or telephone) in the post-policy change period affected reexamination outcomes with suspensions used significantly less in physical case telephone contacts and probation used more in lapses telephone contacts. Hearing outcomes were unaffected. In interviews, the alcohol, physical, lapses, drugs, and knowledge/skill cases each showed less use of sustain and more use of terminate actions in telephone contacts than in-person contacts. Compared to in-person reexaminations, telephone reexaminations were associated with a marginally significant increase in accident rate for the aggregated P&M data when adjustments were made for factors related to driver self-selection. While a significant increase in accident rate for lapses of consciousness cases was found, the magnitude of the increase was greatly diminished when covariate bias adjustments were made. These findings suggest the presence of strong non-randomized self-selection factors. The fact that the pre vs. post analysis failed to show any evidence of a detrimental effect attributable to the policy change also argues against a cause-effect interpretation of the association.

In summary, the policy change allowing telephone contacts had various process outcome effects, but no overall affect on accident rate. Although the overall P&M accident rate was unaffected, there were observed differences in subsequent accident rates by type of contact, with telephone reexaminations showing an almost significant overall increase in accident rate and a significant increase in accident rate for lapses of consciousness cases. These accident rate increases must be viewed with caution, however, due to the possibility of unaccounted for self-selection bias. This study does not resolve whether subject self-selection bias or differences in the conduct of reexamination types accounts for these differences in subsequent accident rates. We recommend that the department examine the reexamination procedure on lapses cases to see whether the content and procedures of the in-person versus telephone contacts differ in practice. Another possibility is that the telephone hearings resulted in softer actions (i.e., more use of probation actions) account for differences in subsequent accident rates. The observed differences might also serve to identify differential risk levels for lapse cases, and the implications of this possibility on the department's handling of such cases should also be explored.

INTRODUCTION

Driver Safety memo DS-92-26, dated June 29, 1992, has led to the gradual conversion of most reexaminations, hearings and interviews from in-person to telephone contacts. The schedule for beginning the P&M conversion was as follows:

- 1/29/93: P&M contacts for Class C licenses
- 6/30/93: P&M contacts for Classes A and B licenses

The gradual implementation of telephone contacts and the initial lack of codes for identifying telephone contacts in the DMV driver database resulted in an historical record that did not begin to validly reflect telephone hearings and interviews until April 1993 and telephone reexaminations until June 1994. This study avoids using data from periods when their accuracy is in doubt.

Since Alzheimer's and mild dementia cases by policy must be seen in driver safety field offices, and since individuals can request in-person contacts, a substantial percentage of contacts continue to be in-person.

Telephone contacts of drivers with P&M conditions have been criticized for not providing hearing officers with the opportunity to see drivers, thus removing their ability to observe visible signs of impairment. This argument is based on the premise that drivers can hide serious impairments in telephone contacts that would be apparent at in-person contacts.

The purpose of this study is to determine if a policy of allowing telephone contacts has altered the types of P&M actions taken or if the effectiveness of P&M actions in decreasing accident risk has changed following the availability of telephone reexaminations. This pre-post design evaluates the net impact of the new policy by comparing P&M cases processed under the previous in-person reexamination hearing procedure with cases processed under the current telephone/in-person option.

Another purpose of this study is to compare the actions and subsequent accident rates of drivers processed by telephone with those processed by in-person contact after the telephone contact option was enacted. It should be noted that this latter evaluation is subject to possible self-selection biases since the driver determines which option is taken. If those who chose, say, an in-person reexamination are different in some way (e.g., miles driven, severity of disorder, attitude, etc.) than those electing the telephone option, these differences could affect the comparability of the two groups and produce differences in outcome which were not actually

caused by the type of reexamination. The comparison of 1992 to 1994 cases is not as subject to self-selection bias because the 1994 group contains all P&M cases irrespective of which reexamination format was chosen. Although it can be argued that this dilutes the ability to detect the “pure” effects of the telephone vs. in-person format, the fact remains that the policy being evaluated involves this option.

The process evaluation components, which examine the actions taken at P&M contact, look at reexaminations, hearings and interviews to determine how actions taken at each type of contact were affected. The 1-year accident evaluation components use the first P&M reexamination of a time period as a reference event. Accidents occurring during the subsequent year are tabulated by P&M reason code, time period, and type of hearing (telephone vs. in-person).

Both parts of the study evaluate aggregated P&M data, as well as effects within each of the six general P&M categories. These categories are alcohol, mental condition, physical condition, lapses of consciousness, drug addiction, and lack of knowledge or skill.

The pre-policy change period was 7/92-12/92, while the post-policy change period was 7/94-12/94. Evaluations were based on P&M contacts which occurred during these times.

Reexamination process outcomes were evaluated for the actions of probation, suspension, revocation, and no action. Less frequently used actions, which often reflect procedural activities, were not included in these analyses.

Hearing and interview process outcomes were evaluated which indicated support (sustain, no action) or reversal (DMV action terminated) of prior actions. These analyses focused on the outcomes of the appeal process.

METHODS

Approximately 40,000 P&M contacts were analyzed in this study, 19,000 from the last half of 1992 and 21,000 from the last half of 1994. Details of P&M contacts were extracted from driver history subrecords, while accident counts were obtained by the standard Research and Development computer extraction procedure.

Analyses of the actions taken at contacts and of the 1-year accident occurrence were made using inferential statistics techniques. Analyses were performed on the Teale Data Center mainframe computer and the Research and Development SUN mini-

computer using statistical software packages. In evaluating differences on subsequent accident rates, some analyses were done which adjusted the groups for differences on age, gender, reason, prior P&M license actions, total points, total accidents, and the accident rate of the driver's residency zip code.

The first set of analyses compares P&M contacts occurring in the pre-policy change period of 7/92–12/92 to those occurring in the post-policy change period of 7/94–12/94. The second set of analyses looks only at the post-policy change period of 7/94–12/94, and compares in-person to telephone contacts.

RESULTS

Part A: The Effects of Policy Change on Process Outcomes and Subsequent Accidents

Reexaminations

The following table summarizes the findings:

Reason	Pre/post difference	Nature of difference	1992 to 1994 relative change*
Overall	Significant	–See individual reasons–	—
Alcohol	None	—	—
Mental	Significant	Probation used more in 1992 than 1994 Revocation used less in 1992 than 1994	-47% +333%
Physical	Significant	Probation used more in 1992 than 1994	-79%
Lapses	Significant	Probation used more in 1992 than 1994	-51%
Drugs	None	—	—
Knowledge/skill	None	—	—

*Relative to what would be expected each year.

These findings indicate that the new policy led to a lower rate of probation actions in three of the six reasons. In one of the three, there was an increase in the rate of revocations, while in the other two no single action increased significantly. The decreased use of probation in half the reasons after the policy change suggests a notable change in actions.

Hearings (action sustained + no action vs. action terminated)

The overall, aggregated hearing data do not show a significant difference in the relative use of “action sustained” plus “no action” (equivalent to sustained in hearings) versus “action terminated” actions between the pre- and post-policy change periods. This indicates that the rate of upholding and terminating prior actions remained the same.

Interviews (sustained + no action vs. action terminated)

The following table summarizes the findings:

Reason	Pre/post difference	Nature of difference	1992 to 1994 relative change*
Overall	Significant	—See individual reasons—	—
Alcohol	Significant	Actions sustained more in 1992 than 1994 Actions terminated less in 1992 than 1994	-20% +9%
Mental	None	—	—
Physical	None	—	—
Lapses	Significant	Actions sustained less in 1992 than 1994 Actions terminated more in 1992 than 1994	+7% -5%
Drugs	None	—	—
Knowledge/Skill	None	—	—

*Relative to what would be expected each year.

These findings show in two reason categories small changes in opposite directions for the rate of action sustained/no action and action terminated. These findings do not show an underlying pre/post policy change difference in the actions taken at interviews.

Requests for Hearings and Interviews

Based on contact counts for all reason codes and actions, the following was found:

	1992	1994	1994/1992
Hearings as a proportion of reexaminations	0.12	0.09	0.78*
Interviews as a proportion of reexaminations	0.64	0.52	0.81

*Slight differences reflect rounding.

These findings indicate that about five and a half times (interview proportion/hearings proportion) as many interviews as hearings were requested in the last halves of both 1992 and 1994. This finding is not unexpected since hearings must occur within 10 days of reexamination while the more informal interviews can occur at any time thereafter. It is noteworthy that the rate of both hearings and interviews decreased by about the same extent after the policy change.

Did Not Appear (DNA) Scheduled Results

Some drivers did not appear (DNA) at scheduled P&M contacts and actions were taken against them. The following table summarizes this situation:

Contact type	Drivers	7-12/1992	7-12/1994
Reexamination	Total	21,177	24,117
	Excluding DNA	13,616 (64.3%)	15,393 (63.8%)
	DMV actions	95.0% suspension 4.5% no action	95.8% suspension 4.1% no action
Hearing	Total	2,454	2,184
	Excluding DNA	2,241 (91.3%)	1,940 (88.8%)
	DMV actions	2.8% suspension 43.7% revocation 53.0% no action	2.0% suspension 9.8% revocation 86.9% no action
Interview	Total	13,652	12,560
	Excluding DNA	11,909 (87.2%)	11,156 (88.8%)
	DMV actions	3.3% suspension 8.5% sustain 85.1% no action 2.2% terminate	6.2% suspension 2.6% revocation 81.2% no action 9.6% terminate

This table shows that the rate of drivers not appearing for each type of contact was about the same after the policy change as before. Reexamination actions were similar after the policy change as before, while hearings showed a large decrease in revocations and increase in no action, and interviews saw sustain actions almost disappear and revocation increase.

These differences suggest that DNA scheduled results differences due to the new policy change did not affect the analysis of reexaminations, but may have contributed to the findings obtained for hearings and interviews.

Accidents

An analysis of the aggregated data showed no significant difference in the rate of drivers having at least one accident for 1-year after P&M reexamination for

contacts in the last halves of 1992 and 1994. Analyses of each of the reason categories also found no significant differences. Therefore, the change in policy did not affect the non-adjusted proportion of drivers having at least one accident during the year after reexamination.

Subsequent analyses were performed to evaluate factors which might contribute to differences between the pre- and post-policy change accident rates. Like the earlier analysis, these analyses showed no difference between the pre/post accident rates. Factors found to be significantly related to accidents were age, gender, reason, prior P&M license actions, total points, total accidents and zip code accident rate. Many of these factors have been found to be related to subsequent accidents by other studies of the general driving population. The significant factors specifically related to the P&M process reflect differences among drivers in actions taken, reasons for hearings, and prior P&M history.

Part B: A Comparison of the Effects of In-Person and Telephone Contacts after the Policy Change

Reexaminations

The following table summarizes the findings:

Reason	In-person/ telephone differences	Nature of difference*	In-person/ telephone differences
Overall	Significant	—See individual reasons—	—
Alcohol	None	—	—
Mental	None	—	—
Physical	Significant	Suspension used less in telephone	-27%
Lapses	Significant	Probation used more in telephone	+67%
Drugs	None	—	—
Knowledge/skill	None	—	—

*Relative to what would be expected for each type of contact.

These findings show changes in a different direction for two of the reasons. There was a 27% decrease in use of license suspension for physical reason codes and 67% increase in use of probation for lapses.

Hearings (action sustained + no action vs. action terminated)

Overall, aggregated hearing data comparing in-person and telephone hearings do not show a significant difference in the rates of sustaining or terminating prior actions for any of the P&M reasons.

Interviews (action sustained + no action vs. action terminated)

The following table summarizes the findings:

Reason	Telephone/in-person differences	Nature of difference*	Telephone/in-person differences
Overall	Significant	–See individual reasons–	—
Alcohol	Significant	Actions sustained less in telephone Actions terminated more in telephone	-86% +22%
Mental	None	—	—
Physical	Significant	Actions sustained less in telephone Actions terminated more in telephone	-22% +25%
Lapses	Significant	Actions sustained less in telephone Actions terminated more in telephone	-63% +35%
Drugs	Significant	Actions sustained less in telephone Actions terminated more in telephone	-52% +41%
Knowledge/skill	Significant	Actions sustained less in telephone Actions terminated more in telephone	-31% +65%

*Relative to what would be expected for each type of contact.

These findings show that less sustaining and more terminating of prior DMV actions occurred in telephone than in-person interviews for five of the six P&M reason categories after the policy changes. This is notable since it clearly shows that the outcomes of telephone appeals differ from those of in-person appeals.

Requests for Hearings and Interviews

Based on contact counts for all reason codes and actions, the following was found:

	In-person	Telephone	Telephone/in-person
Hearings as a proportion of reexaminations	0.04	0.16	3.68*
Interviews as a proportion of reexaminations	0.25	0.94	3.71

*Slight differences between these values and the quotient of the numbers in the table reflect the rounding of those numbers.

These findings show that about six times (interview proportion/hearings proportion) as many interviews as hearings were requested for telephone as for in-person. As in the pre/post analysis, this finding is not unexpected. The increased rate for telephone over in-person contacts was similar for both hearings and interviews.

Did not Appear (DNA) Scheduled Results

The following table summarizes the drivers who did not appear at P&M contacts:

Contact type	Drivers	In-person	Telephone
Reexamination	Total	14,751	9,366
	Excluding DNA	8,531 (57.8%)	6,862 (73.3%)
	DMV actions	96.6% suspension 3.2% no action	93.5% suspension 6.3% no action
Hearing	Total	655	1,529
	Excluding DNA	591 (90.2%)	1,349 (88.2%)
	DMV actions	12.5% revocation 82.8% no action	8.9% revocation 88.3% no action
Interview	Total	8,818	3,742
	Excluding DNA	7,734 (87.7%)	3,433 (92.9%)
	DMV actions	4.9% suspension 2.4% revocation 91.3% no action 1.2% terminate	10.6% suspension 3.1% revocation 46.9% no action 38.1% terminate

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions can be reached:

- The policy change resulted in less use of probation at reexaminations for mental condition, physical condition, and lapses of consciousness reasons. No consistent changes were noted for hearings or interviews.
- The ratios of hearings and interviews to reexaminations (about .10 and .58, respectively) and of hearings to interviews (about .18) were similar in 1992 and 1994.
- Telephone interviews resulted in a lower rate of sustaining actions and a higher rate of terminating actions than did in-person interviews. No consistent changes were seen for reexaminations or hearings.

- There were about four times as many telephone hearings and interviews as in-person hearings and interviews. There were about six times as many interviews as hearings for both telephone and in-person contacts.
- The policy change allowing P&M reexaminations by telephone had no overall negative effect on the 1-year subsequent accident rate of any of the P&M groups.
- For lapses cases processed subsequent to the telephone policy option, telephone reexaminations were associated with a significant 6.2% increase in post-contact accidents compared to in-person hearings. This increase could be reflective of a self-selection bias, or differences in hearing procedures between telephone and in-person contacts.
- Individuals choosing telephone reexaminations may be disproportionately those wanting to hide an impairment from visual observation by a hearing examiner.
- Conversely, these differences may be due to changes in in-person reexaminations and to the addition of telephone reexaminations which, together, resulted in each contact type being conducted differently and neither being conducted like the in-person reexaminations held prior to the policy change.

It is recommended that:

- The department examine lapses of consciousness telephone versus in-person contacts for content and procedure differences in conducting reexaminations. It is possible that softer actions in telephone hearings (for example, more use of probation actions) account for differences in subsequent accident rates. Because subjects selecting reexamination by telephone appear to be of higher risk, the department should consider ways to maximize the risk reduction of such self-identified high risk drivers.
- There are follow-up analyses of the relationship between action severity and subsequent accidents.

TECHNICAL APPENDIX

Purpose of Technical Appendix

The technical appendix provides statistical detail for the findings presented in the body of the report. Findings presented here should be read along with the comparable sections in the body of the report for greatest understanding.

Statistical Analyses

Differences in process outcomes due to the policy change and contact type were analyzed using a log-linear model with the SAS statistical software CATMOD. Data presented were extracted from maximum-likelihood analysis of variance and analysis of maximum-likelihood estimates tables.

Differences in accidents were analyzed three ways, which included 1) differences in proportions for independent binomial experiments using the Z statistic, 2) logistic regression with SAS LOGISTIC, and 3) survival analysis with SAS PHREG. The first analysis did not contain adjustments for the effects of other variables (covariates) on the accident rates, while the last two did contain such adjustments.

Results

Part A: The Effects of Policy Change on Process Outcomes and Subsequent Accidents

Reexaminations

Analyses of the interaction of time (pre- or post-policy change, i.e., last half of 1992 or last half of 1994) and action (probation, suspension, revocation, or no action) are shown in Table TA1.

Table TA1

The Interaction of Time and Action for Process
Outcomes in Reexamination Due to Policy Change

Reason	Analysis of variance		Significant estimates ($p < .01$)		
	Chi-square ¹	Probability	Factor	Chi-square	Probability
Overall	49.53 ²	.0000	— ⁴	— ⁴	— ⁴
Alcohol	0.69	.8767	—	—	—
Mental	35.58	.0000	year x probation year x revocation	9.27 27.45	.0023 .0000
Physical	12.79	.0051	year x probation	11.74	.0006
Lapses	23.36	.0000	year x probation	12.84	.0003
Drugs	10.46	.0151	—	—	—
Knowledge/skill	3.74 ³	.1541	—	—	—

¹ $df = 3$, unless otherwise indicated.

²Reason x year x action, $df = 14$.

³ $df = 2$, because no probation actions occurred for this reason.

⁴See individual reasons.

Significant interactions ($\alpha < .01$) between year and probation actions were seen for the mental, physical, and lapses reasons, and between year and revocation for the mental reason.

Hearings

Analyses of the interaction of time (pre- or post-policy change) and action (sustain or no action versus DMV action) resulted in the nonsignificant ($p = .2095$) interaction of reason x year x action.

Interviews

Analyses of the interaction of time (pre- or post-policy change) and action (sustain or no action versus DMV action terminated) had one degree of freedom for individual reasons. In such cases the analysis of maximum-likelihood estimates are identical to the maximum-likelihood analysis of variance since only one of the two possible estimates are included, with the other being inferred. (One less than the total possible estimates are presented in all analysis of maximum-likelihood estimates tables, with the remaining estimate being inferred.) Therefore, significance estimates (which are the same as the maximum-likelihood analysis of variance values) are not presented in Table TA2, which follows.

Table TA2

The Interaction of Time and Action for Process Outcomes in Interviews Due to Policy Change

Reason	Analysis of variance	
	Chi-square ¹	Probability
Overall	31.74 ²	.0000
Alcohol	12.10	.0005
Mental	0.42	.5190
Physical	4.69	.0304
Lapses	8.02	.0046
Drugs	5.10	.0239
Knowledge/skill	5.17	.0229

¹df = 1, unless otherwise indicated.

²Reason x year x action, df = 5.

Significant interactions ($\alpha < .01$) were observed between year and action for the alcohol and lapses groups.

Accidents

Analysis of the rates of P&M drivers having at least one accident in the pre- and post-policy change periods were first performed based on differences in proportions for independent binomial experiments. The results are shown in Table TA3.

Table TA3

Differences in Accident Rate Due to Policy Change Based on Differences in Proportions

Reason	Z score (post relative to pre)	Significant ($\alpha = .01$, 2-tailed) ¹
Overall	-0.4348	No
Alcohol	-0.1746	No
Mental	-1.7333	No
Physical	+0.2500	No
Lapses	+0.5882	No
Drugs	-2.5000	No
Knowledge/skill	-0.4545	No

¹ $Z_{(\alpha = .01, 2\text{-tailed})} = \pm 2.5750$.

No significant interactions between year and reason were found, although the interaction between year and the drug reason approached significance.

Logistic regression and survival analyses, adjusted for age, gender, reason, prior P&M license actions, total points, total accidents, and zip code accident rate, showed that the time of reexamination (pre- or post-policy change) did not significantly affect the accident rate. The findings are presented in Tables TA4 and TA5.

Table TA4

Differences in Accident Rate Due to Policy Change (Logistic Regression with Covariates)

Variables	Chi-square at entry	Entry sequence	Wald chi-square at end	Pr > chi-square	Final regression coefficients	Odds ratios
Intercept	----	----	2.7945	.0946	-3.4230	----
Total points	253.0	1	76.4451	.0001	0.2107	1.235
Age	106.3	2	121.1925	.0001	0.0120	1.012
Total accidents	84.5596	3	68.9954	.0001	0.3491	1.418
Zip code accidents	29.5771	4	19.1781	.0001	2.2216	9.222
Prior P&M actions	24.1820	5	24.2407	.0001	0.1661	1.181
Reason	19.7075	6	22.2495	.0001	0.0031	1.003
Gender	20.6619	7	20.5733	.0001	-0.2089	0.811
Reexamination year	0.1297	8	0.1297	.7188	-0.0079	0.992

-2 Log L for intercept = 17414.473; -2 Log L for intercept and covariates = 16964.343; chi-square for covariates = 450.131, $df = 8$, $p = .0001$.

Table TA5

Differences in Accident Rate Due to Policy Change (Survival Analysis with Covariates)

Variables	Chi-square at entry	Entry sequence	Wald chi-square at end	Pr > chi-square	Final regression coefficients	Odds ratios
Total points	251.1	1	93.8642	.0001	0.2367	1.267
Age	86.0182	2	98.0145	.0001	-0.0110	0.989
Total accidents	72.3465	3	60.7608	.0001	0.3387	1.403
Prior P&M actions	28.4135	4	28.3503	.0001	0.1761	1.193
Zip code accidents	25.4744	5	26.1468	.0001	1.4102	4.097
Reason	17.4733	6	19.3519	.0001	0.0030	1.003
Gender	16.3626	7	16.3266	.0001	-0.1886	0.828
Reexamination year	0.0455	8	0.0455	.8312	0.0048	1.005

-2 Log L without covariates = 42293.074; -2 Log L with covariates = 41901.500; chi-square for covariates = 391.575, $df = 8$, $p = .0001$.

Survival function plots for subjects in the pre- and post-policy change periods compare the occurrence of accidents in each group during the year after reexamination. The plots, which are shown in Figure 1, reflect the nonsignificant effect of the policy change.

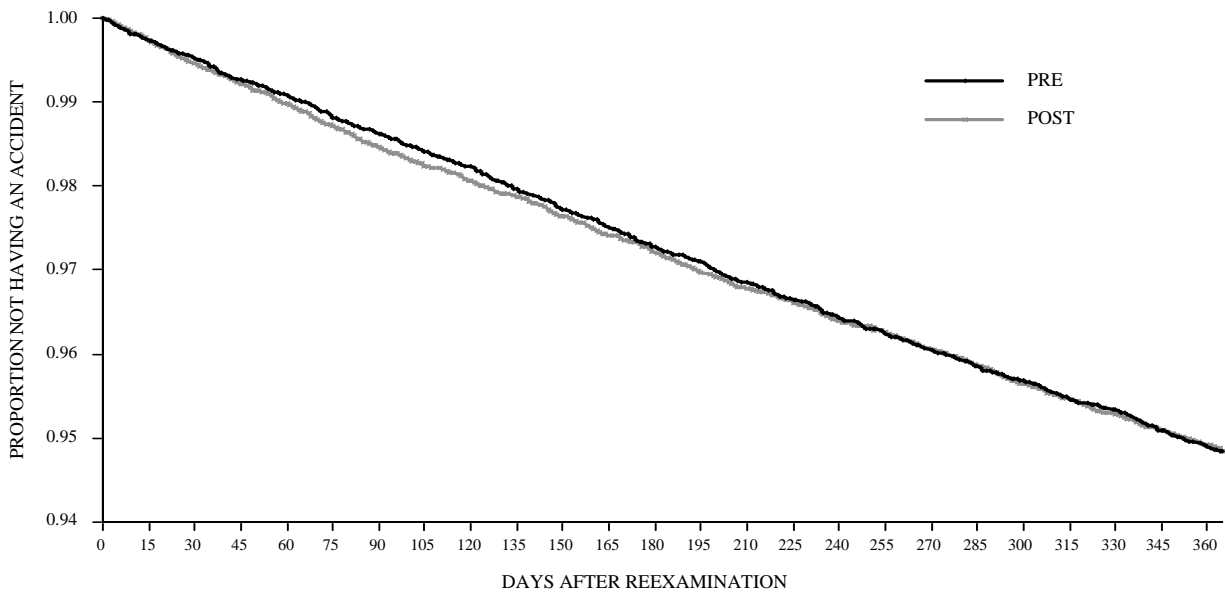


Figure 1 . Survival curves for pre- and post-policy change time reporting.

Part B: The Effects of In-Person and Telephone Contacts on Process Outcomes and Subsequent Accidents

Reexaminations

Analyses of the interaction of contact type (in-person or telephone) and action (probation, suspension, revocation, or no action) are shown in Table TA6.

Table TA6

The Interaction of Contact Type and Action for Process Outcomes
in Reexamination Due to In-Person and Telephone Contacts

Reason	Analysis of variance		Significant estimates ($p < .01$)		
	Chi-square ¹	Probability	Factor	Chi-square	Probability
Overall	38.57 ²	.0004	----	----	----
Alcohol	3.80	.2842			
Mental	2.13	.5455			
Physical	82.79	.0000	contact x suspension	20.72	.0000
Lapses	25.73	.0000	contact x probation	7.68	.0056
Drugs	6.82	.0779			
Knowledge/skill	2.78 ³	.2489			

¹ $df = 3$, unless otherwise indicated.

²Reason x year x action, $df = 14$.

³ $df = 2$, because no probation actions occurred for this reason.

⁴See individual reasons.

Significant interactions ($\alpha = .01$) were found between contact type and suspension for physical reason, and between contact type and probation for the lapses reason.

Hearings

Analysis of the interaction of contact type (in-person or telephone) and action (sustain or no action versus DMV action terminated) resulted in the nonsignificant ($p = 0.8850$) interaction of reason x contact type x action.

Interview

Analysis of the interaction of contact type (in-person or telephone) and action (sustain or no action versus DMV action terminated) had one degree of freedom for individual reasons. As explained above, the significance estimate is the same as the analysis of variance maximum-likelihood so those estimates are not shown in Table TA7.

Table TA7

The Interaction of Contact Type and Action for Process
Outcomes in Interviews Due to In-Person and Telephone Contacts

Reason	Analysis of variance	
	Chi-square ¹	Probability
Overall	18.33 ²	.0026
Alcohol	23.85	.0000
Mental	1.80	.1796
Physical	19.23	.0000
Lapses	127.36	.0000
Drugs	6.82	.0090
Knowledge/skill	28.50	.0000

¹ $df = 1$, unless otherwise indicated.

²Reason x year x action, $df = 5$.

Significant interactions between year and action were observed in all reason groups, except mental.

Accidents

Analyses of the rates of P&M drivers having at least one accident in the in-person and telephone contact groups during the post-policy change period were first performed based on differences in proportions for independent binomial experiments. The Z test statistic was used and there were no adjustments for the effects of other variables (covariates) on the accident rates. The results are presented in Table TA8.

Table TA8

Differences in Accident Rate Due to Contact Type Based on Differences in Proportions

Reason	Z score (in-person relative to telephone)	Significant ($\alpha = .01$, 2-tailed) ¹
Overall	+2.8130	Yes ($p = .0025$)
Alcohol	-0.5667	No
Mental	+0.1124	No
Physical	-0.5263	No
Lapses	+4.0385	Yes ($p < .0001$)
Drugs	+1.1500	No
Knowledge/skill	-0.6522	No

¹ $Z(\alpha = .01, 2\text{-tailed}) = \pm 2.5750$.

A significant interaction was found between the overall (aggregated) reason groups and contact type, as well as between the lapses reason and contact type.

Logistic regression and survival analyses, adjusted for age, gender, reason, prior P&M license actions, total points, total accidents, and zip code accident rate, showed that contact type (in-person or telephone) was only marginally significant overall (i.e., for all the reason groups combined or collapsed), but was highly significant for the lapses of consciousness reason group. The findings for the overall sample are presented in Tables TA9 and TA10.

Table TA9

Differences in Accident Rate Due to Contact Type
(Logistic Regression with Covariates)

Variables	Chi-square at entry	Entry sequence	Wald chi-square at end	Pr > chi-square	Final regression coefficients	Odds ratios
Intercept	----	----	339.7891	.0001	-4.3800	----
Total points	116.9	1	31.7546	.0001	0.1843	1.202
Age	69.7149	2	72.9413	.0001	0.0127	1.013
Total accidents	44.8103	3	36.4959	.0001	0.3494	1.418
Zip code accidents	17.3938	4	14.8807	.0001	3.0402	20.909
Prior P&M actions	11.3605	5	11.7880	.0006	0.1441	1.155
Gender	9.3474	6	10.1809	.0014	-0.2016	0.817
Reason	8.9331	7	8.0196	.0046	0.0027	1.003
Contact type	4.1760	8	4.1717	.0411	0.0253	1.026

-2 Log L for intercept = 9171.694; -2 Log L for intercept and covariates = 8930.180; chi-square for covariates = 241.514, $df = 8$, $p = .0001$.

Table TA10

Differences in Accident Rate Due to Contact Type (Survival Analysis with Covariates)

Variables	Chi-square at entry	Entry sequence	Wald chi-square at end	Pr > chi-square	Final regression coefficients	Odds ratios
Total points	125.2	1	47.3706	.0001	0.2251	1.253
Age	55.0598	2	57.1057	.0001	-0.0114	0.989
Total accidents	34.1079	3	28.2678	.0001	0.3245	1.383
Zip code accidents	14.9506	4	12.7987	.0003	2.7889	16.263
Prior P&M actions	13.8969	5	14.3345	.0002	0.1551	1.168
Reason	8.0621	6	8.0344	.0046	0.0027	1.003
Gender	7.6171	7	7.5429	.0060	-0.1756	0.839
Contact type	3.2282	8	3.2250	.0725	0.0226	1.023

-2 Log L without covariates = 20986.440; -2 Log L with covariates = 20776.100; chi-square for covariates = 210.340, $df = 8$, $p = .0001$.

Survival function plots for subjects having in-person or telephone reexaminations compare the occurrence of accidents in each group during the year after reexamination. The plots, which are shown in Figure 2, reflect the marginally significant overall 2.3% effect of contact type on the collapsed reason groups, as determined by survival analysis.

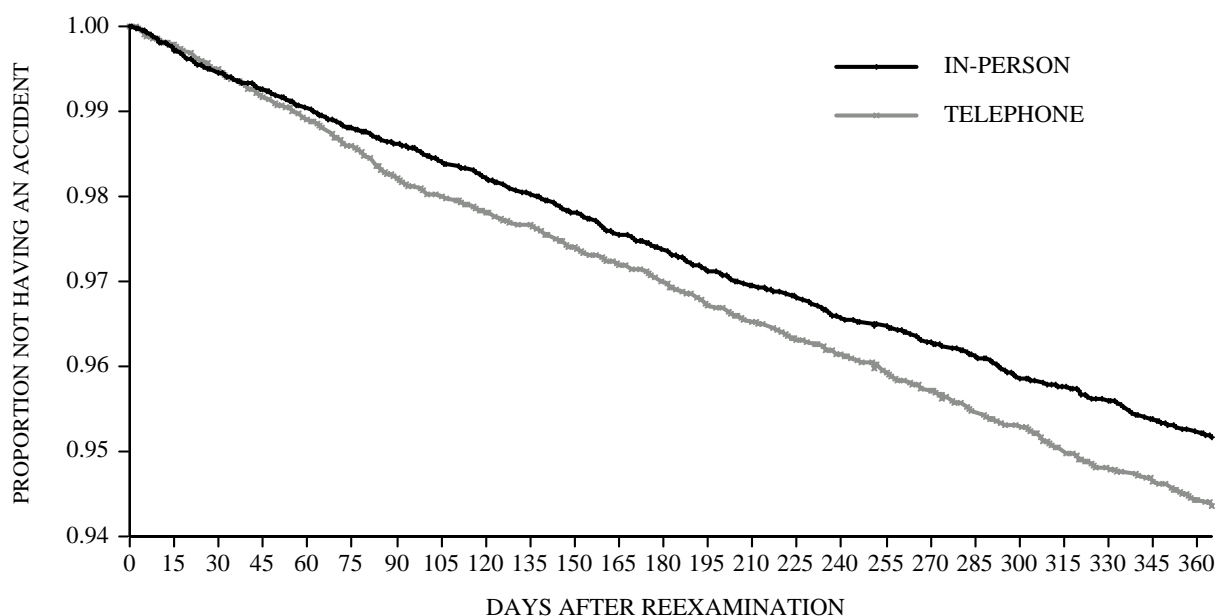


Figure 2 . Survival curves for in-person and telephone contacts: overall.

Logistic regression and survival analyses of the lapses of consciousness reason group, adjusted for age, gender, prior P&M license actions, total points, total accidents, and zip

code accident rate, showed that contact type was still highly significant. Individuals having telephone reexaminations were more likely to have accidents in the subsequent year than were those having in-person reexaminations. The results of these analyses are presented in Tables TA11 and TA12.

Table TA11

Lapses of Consciousness Differences in Accident Rate Due to Contact Type
(Logistic Regression with Covariates)

Variables	Chi-square at entry	Entry sequence	Wald chi-square at end	Pr > chi- square	Final regression coefficients	Odds ratios
Intercept	----	----	194.8363	.0001	-4.0273	----
Total points	53.0123	1	17.5379	.0001	0.2425	1.274
Age	31.5527	2	31.7232	.0001	0.0152	1.015
Total accidents	14.4885	3	12.2892	.0005	0.3251	1.384
Contact type	13.9322	4	11.8887	.0006	0.0628	1.065
Gender	11.5910	5	11.1802	.0008	-0.3118	0.732
Zip code accidents	3.4945	6	3.4637	.0627	2.3668	10.663
Prior P&M actions	0.4477	7	0.4475	.5035	0.0411	1.042

-2 Log L for intercept = 4108.913; -2 Log L for intercept and covariates = 3993.819; chi-square for covariates = 115.094, $df = 7$, $p = .0001$.

Table TA12

Lapses of Consciousness Differences in Accident Rate Due to Contact Type
(Survival Analysis with Covariates)

Variables	Chi-square at entry	Entry sequence	Wald chi- square at end	Pr > chi- square	Final regression coefficients	Odds ratios
Total points	58.1391	1	23.0094	.0001	0.2947	1.343
Age	28.0160	2	28.2602	.0001	-0.0145	0.986
Contact type	11.5281	3	9.6493	.0019	0.0573	1.059
Gender	11.1196	4	10.2181	.0014	-0.3029	0.739
Total accidents	8.8632	5	8.8728	.0029	0.3009	1.351
Zip code accidents	2.7742	6	2.7165	.0993	2.0785	7.993
Prior P&M actions	0.5892	7	0.5890	.4428	0.0465	1.048

-2 Log L without covariates = 8736.511; -2 Log L with covariates = 8631.679; chi-square for covariates = 104.833, $df = 7$, $p = .0001$.

Survival function plots for subjects in the lapses of consciousness reason group having in-person or telephone reexaminations compare the occurrence of accidents for each contact type during the year after reexamination. The plots, which are shown in Figure 3, reflect the highly significant 5.9% effect of contact type on this reason group, as determined by survival analysis.

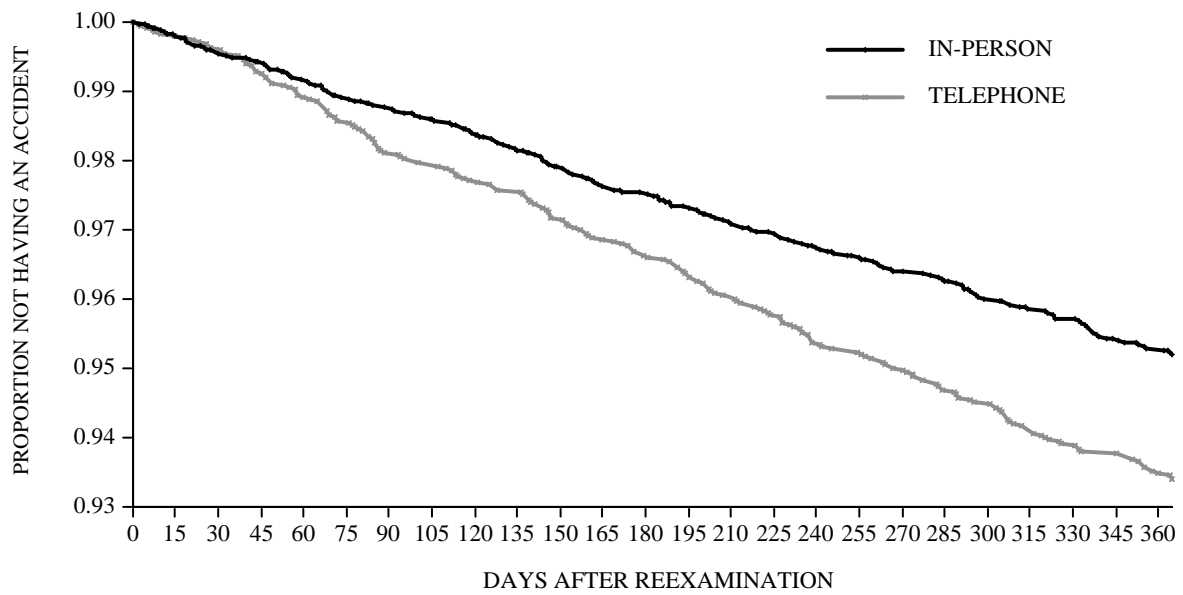


Figure 3 . Survival curves for in-person and telephone contacts: lapses of consciousness.